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**Abstract**

# THE "DON" PROJECT

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The DON Project is dedicated to the development of a heavy water-moderated, organic-cooled system which can operate on natural uranium fuel when built on a large scale.

A 30 MWe reactor has been designed to serve as a prototype. Experimental facilities have been incorporated to permit the irradiation of nuclear materials and fuel elements. Isotope production channels have also been included.

A Title I design has been completed by the JEN and the American firm Atomics International. Additional research and development work is also underway where needed.

The cool moderator is contained in an aluminium calandria. The hot coolant circulates from a toroidal inlet header through flexible lines to hot pressure tubes located within the calandria tubes. It removes the heat generated in the fuel elements and flows through flexible lines to the toroidal outlet header. The pressure tubes are made of SAP alloy

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joined to steel and pieces.

The fuel element is a 19-rod cluster of UC pellets clad in finned SAP tubes. Control is provided by $B_4C$ rods submerged in the moderator.

Specifications of high-density, arc cast UC are discussed in the paper. SAP quality is considered satisfactory for fuel sheaths; better knowledge of its long term properties is desirable for the process tubes. Preliminary results on UC-SAP compatibility are encouraging. No appreciable reaction is found below 500°C. Compatibility tests are underway both at AI and JEN facilities. These tests point out to hyperstoichiometric UC for SAP-clad elements. Development work is being carried out on SAP-Stainless steel joints, control rod drives fuel handling machine and other areas.